# Igneous Rocks

## Key Concepts

- What characteristics are used to classify igenous rocks?
- How are igneous rocks used?

Igneous rock is any rock that forms from lava or magma. The name "igneous" comes from the Latin word *ignis*, meaning "fire." **Igneous rocks are classified according to their origin, texture and mineral composition.**

**Extrusive igneous rock** is igneous rock formed from lava that erupted onto Earth's surface. Basalt is the most common extrusive igneous rock because it makes up the ocean crust. It also forms shield volcanoes and lava plateaus. Igenous rock that formed when magma hardened beneath Earth's surface **intrusive igneous rock**. Granite is the most common intrusive igneous rock in continental crust. It forms the core of many mountain ranges.

**The texture of an igneous rock depends on the size and shape of its mineral crystals**. The only exceptions to this rule are the different types of volcanic glass—igneous rock that does not have a crystal structure. Igneous rocks may be similar in mineral composition, and yet have very different textures. Lava that cools rapidly forms fine-grained igneous rocks with small crystals. Magma that cools slowly forms coarse-grained rock with large crystals. **Intrusive igneous rocks have larger crystals than extrusive igneous rocks**. Extrusive igneous rocks have a fine-grained or glassy texture. Basalt, for example, is an extrusive igneous rock whose crystals are too small to be seen without a microscope.

The silica content of lava and magma can vary. Lava that is low in silica usually forms dark-colored rock, such as basalt. Magma that is high in silica usually forms light-colored rock, such as granite. Granite, however, comes in many shades and colors, from nearly black to light gray, red and pink. The mineral composition of granite determines the color.

Many igneous rocks are hard, dense and durable. **People throughout history have used igneous rock for tools and building materials**. Granite has a long history as a building material. Ancient Egyptians used granite for statues. About 600 years ago, the Incas of Peru carefully fitted together great blocks of granite and other igneous rocks to build a fortress near Cuzco, their capital city. In the United States in the 1800s and early 1900s, granite was widely used to build bridges and public buildings and for paving streets with cobblestones. Granite is still used in decorative stonework, curbstones and floors. Basalt is crushed to make gravel that is used in construction.

The rough surface of pumice makes it a good abrasive for cleaning and polishing. Obsidian was used by ancient Native Americans to make sharp tools. Perlite, formed from the heating of obsidian, is often mixed with soil for starting vegetable seeds.

Name _____ Date _____ Period _____

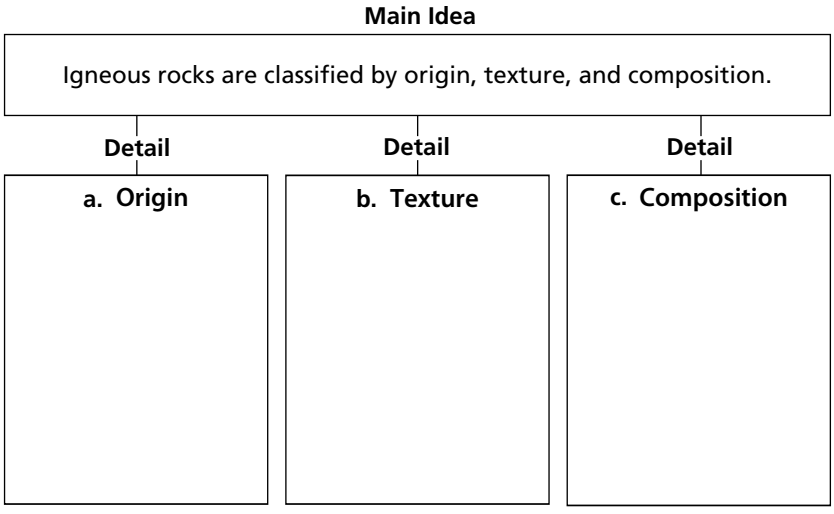


# Igneous Rocks

*This section describes the characteristics and uses of igneous rocks.*

## Use Target Reading Skills

*As you read about igneous rocks, fill in the detail boxes that explain the main idea in the graphic organizer below.*



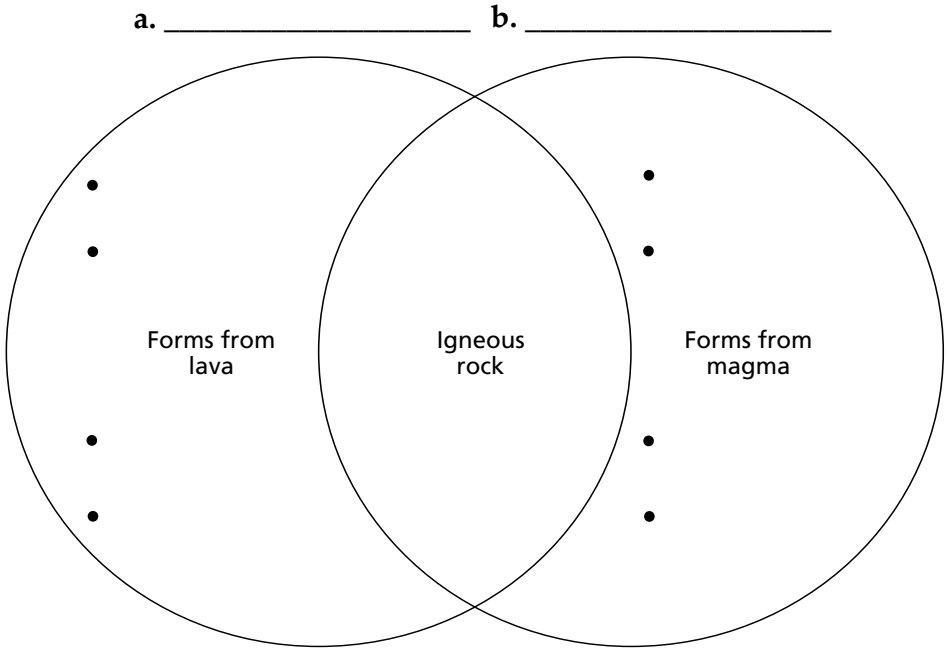

## Classifying Igneous Rocks

**1.** Circle the letter of the definition of igneous rock.

- **a.** Rock that forms from minerals
- **b.** Rock that contains iron
- **c.** Rock that forms from magma or lava
- **d.** Rock that contains crystals

## Igneous Rocks *(continued)*

**2.** Complete the Venn diagram by labeling each circle with the type of igneous rock it represents.




**c.** Use the Venn diagram to compare and contrast the two types of igneous rocks.

**3.** Is the following sentence **true** or **false**? Extrusive rock forms beneath Earth's surface.

_____

**4.** Circle the letter of **each sentence** that is true about basalt.

**a.** It forms oceanic crust.

**b.** It is the most common intrusive igneous rock.

**c.** It forms from lava.

**d.** It forms beneath Earth's surface.

**5.** Circle the letter of **each sentence** that is true about granite.

**a.** It is the most abundant intrusive rock in continental crust.

**b.** It forms the core of many mountain ranges.

**c.** It forms from magma.

**d.** It forms on top of the crust.

**6.** The texture of an igneous rock depends on the size and shape of its _____.

**7.** Is the following sentence **true** or **false**? Igneous rocks with similar mineral compositions always have the same textures. _____

Match the type of texture of igneous rocks with how rocks of that texture form.

| **Type of Texture** | **How Rocks of That Texture Form** |
|---|---|
| ____ **8.** fine-grained | **a.** Lava cools very rapidly. |
| ____ **9.** coarse-grained | **b.** Lava cools rapidly. |
| ____ **10.** glassy | **c.** Magma cools slowly. |

**11.** Is the following sentence true or false? Extrusive rocks have smaller crystals than intrusive rocks. _____

**12.** What type of texture do extrusive rocks such as basalt have?_____

_____

**13.** What is obsidian? _____

_____

**14.** Describe the texture of obsidian. _____

**15.** Circle the letter of **each sentence** that is true about the silica composition of igneous rocks.

**a.** Igneous rocks low in silica are usually dark-colored.

**b.** An example of an igneous rock that is low in silica is granite.

**c.** Igneous rocks high in silica are usually light-colored.

**d.** An example of an igneous rock that is high in silica is basalt.

# Igneous Rocks *(continued)*

## Uses of Igneous Rocks

**16.** Why have people throughout history used igneous rocks for tools and building materials? _____

_____

**17.** Describe three ways granite has been used throughout history.

**a.** _____

_____

**b.** _____

_____

**c.** _____

_____

**18.** Complete the table that shows the ways igneous rocks are used.

| How Some Igneous Rocks Are Used | |
|---|---|
| **Type of Igneous Rock** | **Way It Is Used** |
| Basalt | Gravel for construction |
| a. | Cleaning and polishing |
| b. | Soil mixes |

**c.** Use the information in the table to draw a conclusion about the uses of igneous rocks. You may use more than one sentence.

_____

_____

_____

_____

# Igneous Rocks



## Understanding Main Ideas

*Fill in the blanks in the table below.*

| Origin of Igneous Rock | Resulting Texture |
|---|---|
| Slow cooling of magma far beneath Earth's surface | **1.** _____ |
| Extremely rapid cooling of lava in which no crystals form | **2.** _____ |
| Rapid cooling of lava in which tiny crystals form | **3.** _____ |

*Answer the following questions.*

**4.** What is the most common extrusive rock? Where is it found?

**5.** What is the most common intrusive rock? Where is it found?

**6.** Explain how the silica content of molten material affects the color of igneous rocks.

**7.** What qualities of igneous rocks have long made them useful for tools and building materials?

**8.** Describe one use each for the igneous rocks granite, basalt, and pumice.

## Building Vocabulary

*Fill in the blank to complete each statement.*

**9.** Igneous rock formed from lava that erupted onto Earth's surface is called _____ rock.

**10.** Igneous rock formed from magma below Earth's surface is called _____ rock.

# The Same But Different

Can two different rocks with different names have the same mineral composition? The answer is yes. There are six major kinds of igneous rocks: granite, diorite, gabbro, rhyolite, andesite and basalt. Geologists usually groups these six types of igneous rocks in pairs, because each pair generally contains the same minerals. Study the table below to see which igneous rocks are the same but different.

**Common Igneous Rocks**

| | | | |
|---|---|---|---|
| **Intrusive rocks (course-grained)** | Granite | Diorite | Gabbro |
| **Extrusive rocks (fine-grained)** | Rhyolite | Andesite | Basalt |
| **Minerals** | Quartz, Feldspar, Muscovite, Amphibole | Amphibole, Feldspar, Pyroxene | Feldspar, Pyroxene, Olivine, Amphibole |
| **Color** | Light colored | Medium gray or green | Dark gray to black |
| → → → → → → → → Silica content of rock decreases → → → → → → → → | | | |
| → → → → → → → → Rock color becomes darker → → → → → → → → | | | |

*Answer the following questions.*

**1.** Which of the six major kinds of igneous rock are intrusive and which are extrusive?

**2.** Compare granite with rhyolite. How are they similar? How are they different?

**3.** Compare the mineral composition of diorite with the mineral composition of andesite.

**4.** In what way is gabbro different from basalt? What can you infer from this about how these two kinds of igneous rock form?

**5.** How is granite like gabbro?

**6.** Which rock has more silica in it, **granite** OR **basalt**?

**7.** Is a rock with more silica in it likely to be lighter or darker in color than a rock with less silica in it?